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TACOM Case # 21906, 26 May 2011.

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Vehicle Electronics and Architecture

May 26, 2011

Report Documentation Page

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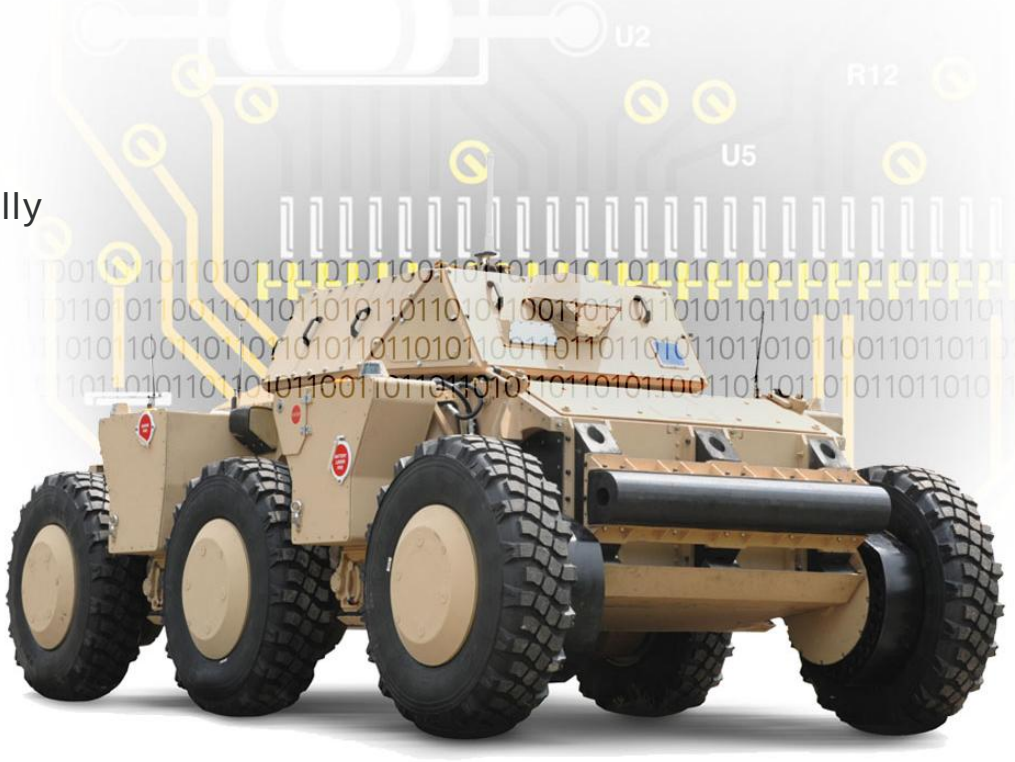
What We Do

- The **Vehicle Electronics and Architecture (VEA)** focus area is responsible for developing the essential support structure needed to accommodate the numerous advanced technologies prevalent in today's ground vehicles.

- We develop the software and data networks necessary to ensure those technologies work together successfully without compromising power and mobility.

- TARDEC's VEA work centers on three core functions:
  - **Electrical power**
  - **Vehicle Architecture**
  - **Systems integration laboratories (SILs)**



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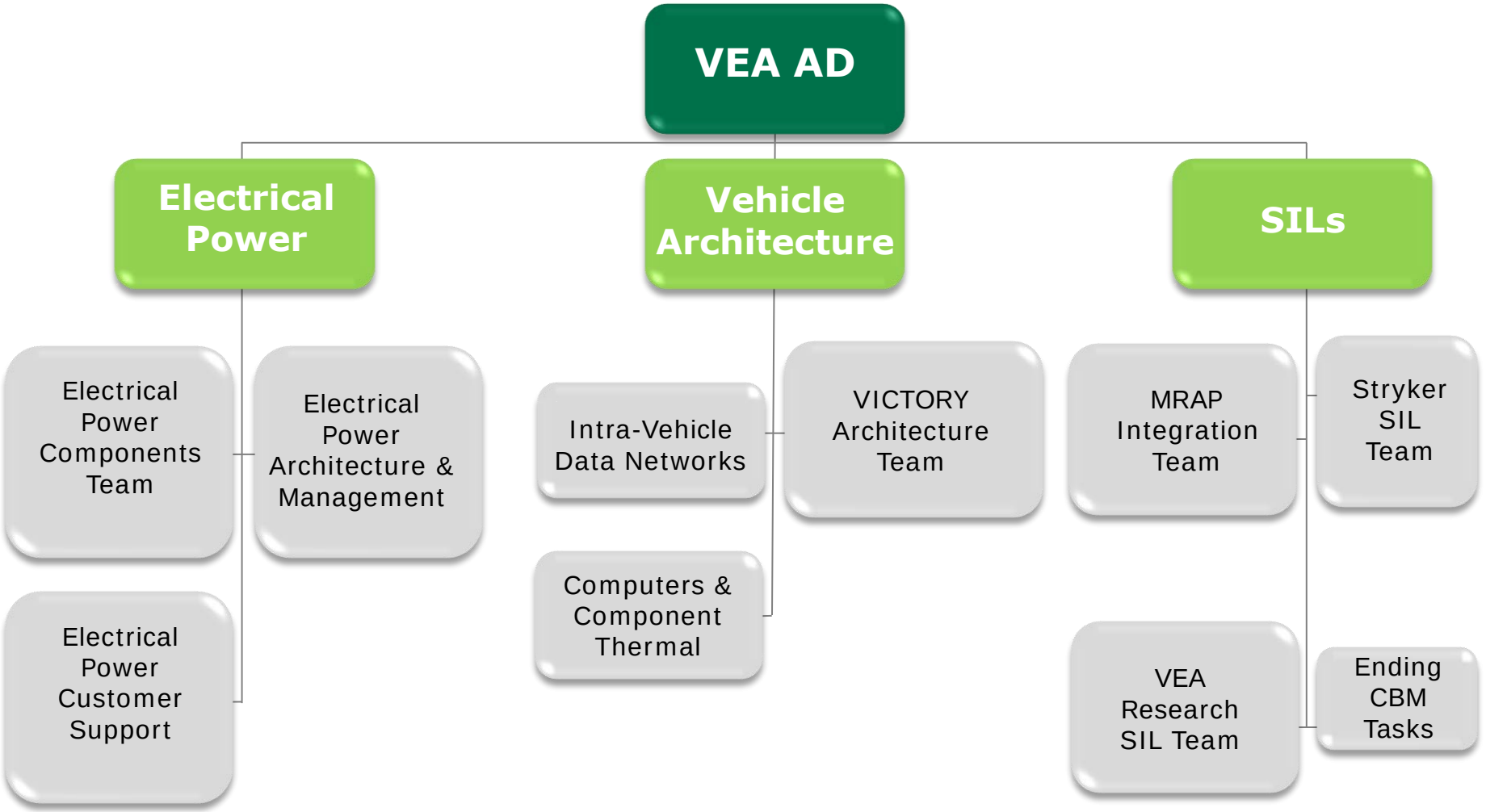
Who We Are



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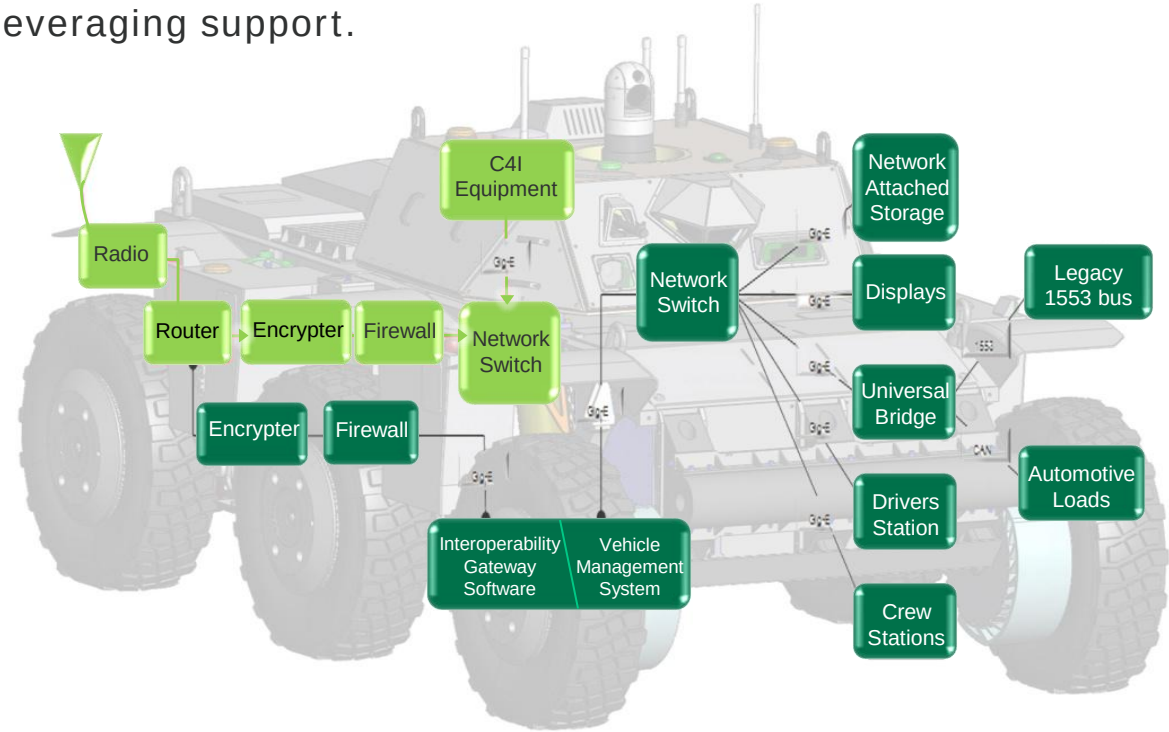
Doing More Without More

- The Army has placed a renewed emphasis on **developing efficiencies** where possible in order to get the best value from our limited resources.

- At TARDEC this has meant **streamlining processes** and working more closely with our partner organizations by aligning portfolios and leveraging support.

- Several of the major projects currently underway within VEA contribute to these efforts by exploiting the potential for **commonalities** between vehicle platforms.



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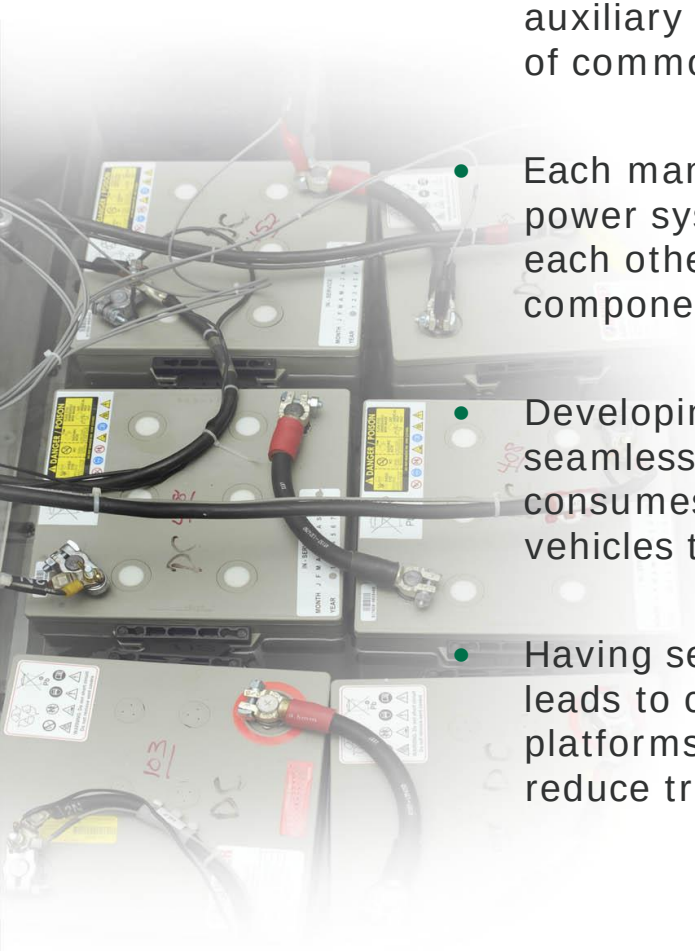
Electrical Power



- The **Electrical Power** group focuses on customer engineering, research and development, architecture and management and auxiliary systems. One current project of note is the development of common electrical power standards.
- Each manufacturer uses its own voltage standard for electrical power systems and the different standards are not compatible with each other, meaning vehicles often require unique solutions and components.
- Developing an enabler for electrical power architecture will allow seamless electrical integration of any load that converts or consumes electrical power. It creates commonalities for ground vehicles that adopt the standards.
- Having set standards for new start and modernization programs leads to common components and plug and play ability between platforms, common implementations and control schemes that reduce training.

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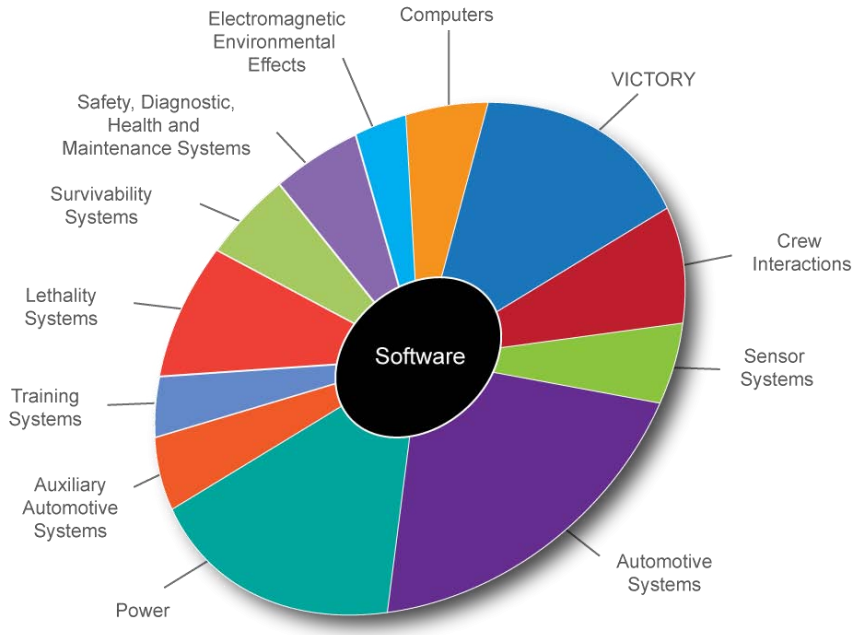
Vehicle Architecture

- **Vehicle Architecture** consists of intra-vehicle data networks, computers and component thermal and VICTORY architecture teams.
- One major current focus in this area for TARDEC is the Vehicular Integration for Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance/Electronic Warfare (C4ISR/EW) Interoperability (VICTORY) architecture.
- VICTORY architecture is being developed as a solution to the "bolt-on" approach to integrating C4ISR systems into ground vehicles.
- This approach inhibits functionality, negatively impacts the vehicle's size, weight and power and limits space for the crew.

The Vehicle Architecture Problem Space



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VICTORY Architecture

- **VICTORY** will reduce these issues by embedding these systems directly into the platform. It provides a framework architecture, standard specifications and design guideline input.

- Originally initiated by Program Executive Office (PEO) Command, Control, Communications – Tactical (C3T), the program is a joint effort between TARDEC VEA, PEO Ground Combat Systems (GCS) and PEO Combat Support & Combat Service Support (CS&CSS).

- The end result is a capability set readily integrated onto platforms without impeding crew performance.

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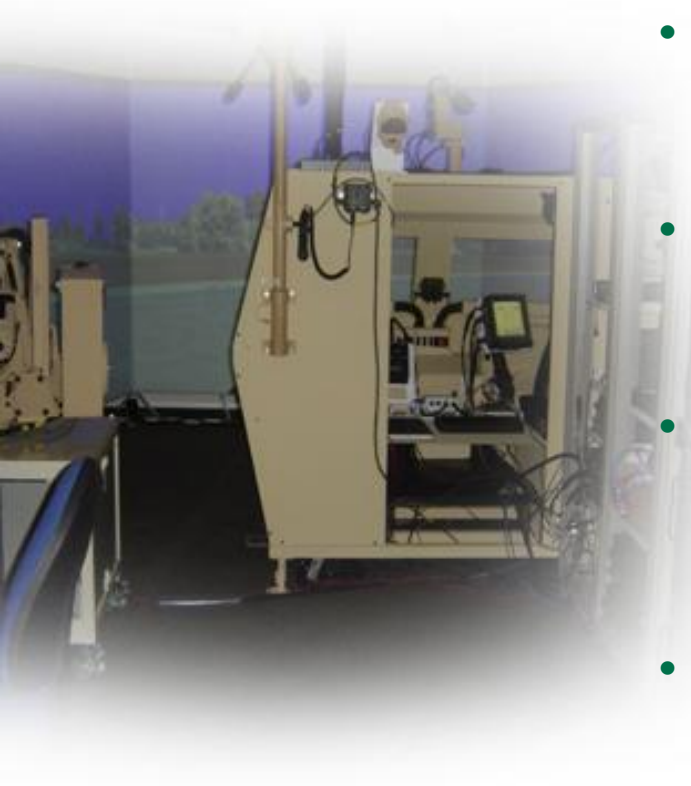
SIL



- The **SIL** group supports Stryker Brigade Combat Team, Heavy Brigade Combat Team and the Mine Resistant Ambush Protected (MRAP) vehicle Integration Team.
- The SIL will be able to configure multiple vehicle electronics implementations quickly to get valuable data to those who need it.
- It will centralize the Army's approach to integrating electronics on ground vehicles, saving cost and reducing redundant work across multiple programs, while also supporting modernization efforts.
- This group is also working to develop a **Common SIL** that will have the ability to test any piece of hardware to verify it is compatible with an open architecture and is VICTORY compliant.

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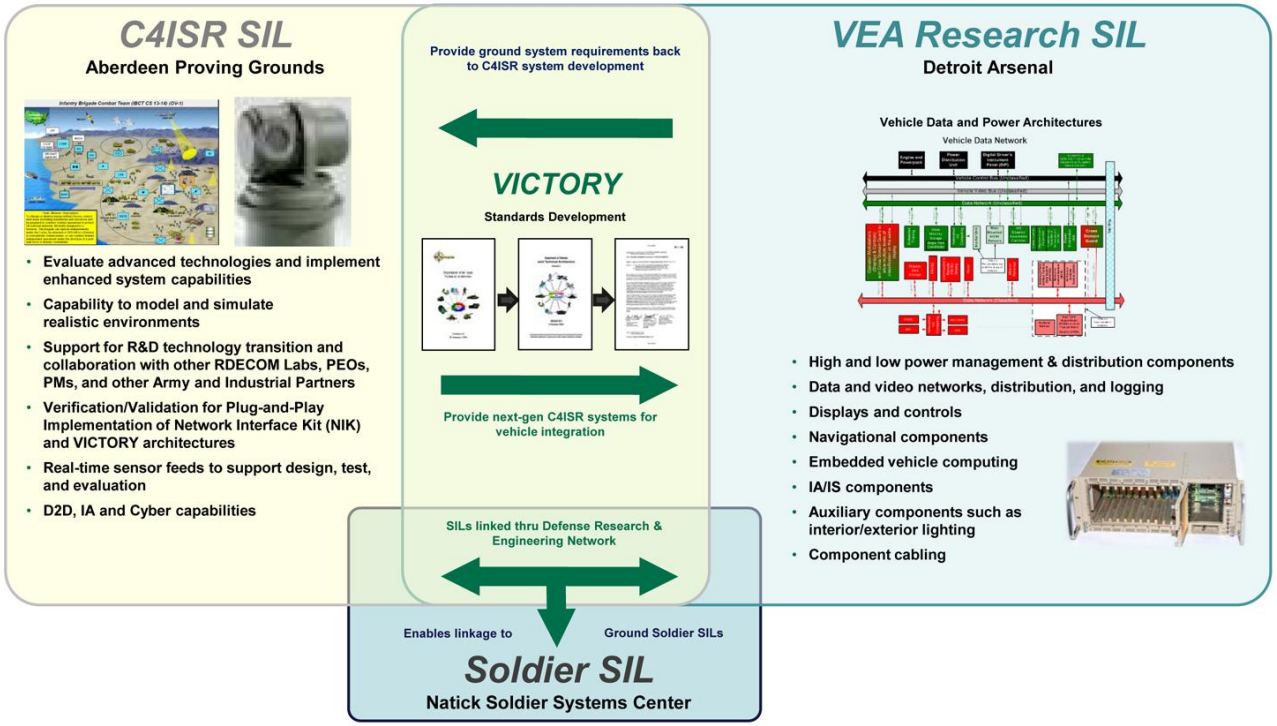
Common SIL

- This effort requires a heavy systems engineering focus, especially for the detailed systems analysis to develop baseline requirements.
- The Common SIL will be based on a generic vehicle architecture and will feed other SILs such as MRAP, Medium Tactical Vehicle Replacement, and PEO GCS commonality.
- VEA will have the ability to quickly turn around tasks regarding power studies, C4ISR integration, vehicle electronics and human systems integration and investigate fielded issues with an actual vehicle.

The Common SIL will be a series of distributed SILs to develop integrated C4ISR systems and create the next generation of combat vehicle architecture.



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Summary

- TARDEC's VEA efforts to **create efficiencies** are aligned with Army goals and aimed at helping support the current and future force.
- The work of the VEA group makes it possible for the latest, most advanced technology solutions to be integrated into vehicle platforms, which ultimately **ease warfighter burdens and help save lives.**
- VEA will continue to be a **vital part of ground vehicle systems.**

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